ME 260: Structural Optimization: Size, Shape, and Topology		
Assigned: Nov. 12, 2021	Quiz 7	Due: Nov. 16, 2021

True or False Questions (1 point)

1. The design variable in shape optimization is the "design velocity", directly or indirectly.
2. Topological derivative concept has its roots in the shape derivative.
3. Topological derivative can be derived for only creating a hole but not for adding material.

Multiple Choice Questions (1 point)

(i) What are all true about topology optimization of multiphysics problems?
   a. Adjoint method applies for sensitivity analysis.
   b. Design parameterization should ensure that intermediate states are respected by all governing equations.
   c. Optimality criteria method does not apply.

(ii) When the physical domains are coupled both ways…what are all true among the statement below?
   a. The adjoint variables can be solved for sequentially.
   b. The adjoint variables cannot be solved sequentially.
   c. The adjoint variables can be solved before solving for the corresponding state variables.

Computational question (1 point)

Derive the expression for the shape derivative of strain energy w.r.t. to the rounding-off radius of a structure shown below. Evaluate it in COMSOL environment and verify your expression with the help of COMSOL Multiphysics. Use suitable numerical values for dimensions, material properties, and force.